

# Efficient longest flow path algorithm

## Workspace

r.accumulate



```
\[ \def\LFP{\overrightarrow{\text{LFP}}} \def\FP{\overrightarrow{\text{FP}}} \def\FL{\text{FL}}
\def\DFL{\text{DFL}} \def\UFL{\text{UFL}} \def\LFL{\text{LFL}} \]
```

A flow path  $\text{FP}_i$  is the watercourse between a pair of two points  $i$  within the watershed and the longest flow path  $\text{LFP}$  is defined as

```
\[ \text{LFP} \in \left\{ \text{FP}_i; \left| \text{FP}_i \right| \geq \left| \text{FP}_j \right|; \forall i \neq j \right\} . \]
```

The longest flow path plays an important role in hydrologic modeling, but its computation requires multi-step raster calculations for each watershed. This research project aims to improve the current process and efficiency of computing the longest flow path for a lot of watersheds.

## Performance comparisons



Method	lfp.sh	lfp2.sh	r.lfp	r.accumulate
Elapsed time	3h 48m	9h 8m	6h 46m	<b>56s</b>

## References

- Huidae Cho, July 2020 in Press. A recursive algorithm for calculating the longest flow path and its iterative implementation. [Environmental Modelling & Software](https://doi.org/10.1016/j.envsoft.2020.104774). 10.1016/j.envsoft.2020.104774. SCIE, 2018 Impact Factor 4.552, [Author's Version](#).
- [How to calculate the longest flow path in GRASS GIS](#)

projects

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